



Pyriproxyfen/129032/Valent USA Corporation
OPPTS 860.1500
Crop Field Trial - Summer Squash

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Registration Action Branch 1
(RAB1)
Health Effects Division
(HED) (7509C)

STUDY REPORT:

MRID No. 455560-08 C.A. Green (2001) Magnitude of the Residues of Pyriproxyfen on Summer Squash. Laboratory Project Identification Number: 20167. Unpublished study prepared by Valent USA Corporation. 166 pages.

EXECUTIVE SUMMARY:

Supervised crop field trials were conducted in California, Florida, North Carolina, Pennsylvania, South Carolina, and Wisconsin in/on summer squash treated two times at an application rate of 0.066 lb ai/A (seasonal rate of 0.132 lb a.i./A) with a pre-harvest interval (PHI) of 7 days and a retreatment interval (RTI) of 13-14 days. The results from these trials show that no detectable pyriproxyfen residues were found in any of the treated or untreated samples. The limit of quantitation (LOQ) was established at 0.01 ppm.

COMPLIANCE:

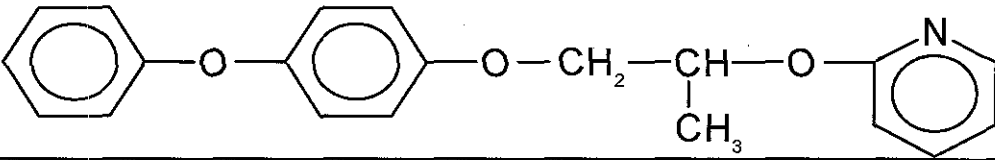
Signed and dated Good Laboratory Practices (GLP), Quality Assurance and Data Confidentiality statements were provided. Several minor GLP deviations were noted, although they did not impact the validity of the study.



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A. BACKGROUND INFORMATION

Pyriproxyfen is an analogue of an insect juvenile hormone and interferes with the hormonal control of insect growth and development, thereby inhibiting egg hatch, larval embryogenesis, metamorphosis, and adult emergence. There are currently three end-use products of pyriproxyfen with food/feed uses that are registered to Valent: two emulsifiable concentrates (EC) and a wettable powder (WP). These formulations are registered for use on bushberry, citrus fruits, cotton, fruiting vegetables, guava, lychee, pome fruits, stone fruits, and tree nuts, and are marketed under the trade names KNACK[®] Insect Growth Regulator [0.86 lb/gal EC; EPA Reg. No. 59639-95], ESTEEM[®] Insect Growth Regulator [2.9 lb/gal EC; EPA Reg. No. 59639-104], and ESTEEM[®] 35 WP Insect Growth Regulator [35% WP; EPA Reg. No. 59639-115].

TABLE A.1. Test Compound Nomenclature	
Compound $C_{20}H_{19}NO_3$	Chemical Structure 
Common name	Pyriproxyfen
IUPAC name	4-phenoxyphenyl (RS)-2-(2-pyridyloxy)propyl ether
CAS name	2-[1-methyl-2-(4-phenoxyphenoxy)ethoxy]pyridine
CAS #	95737-68-1
End-use product/EP	Knack IGR, Esteem IGR



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B. EXPERIMENTAL DESIGN

B.1. Study Site Information

No extreme weather events were noted at any of the field trial sites involved in the present study. Where necessary, irrigation was provided.

TABLE B.1.1. Study Use Pattern.								
Location (City, State/Year)	EP ¹	Application						Tank Mix Adjuvants
		Timing	Rate, lb a.i./A	RTI (days)	Treat. No.	Method ²	Total Rate, lb a.i./A	
Lehigh County, PA/1999	Knack IGR (0.86 EC)	1) 21 (\pm 1) days before harvest 2) 7 (\pm 1) days before harvest	1) 0.0688 2) 0.0677	14	2	tractor-mounted boom sprayers	0.136	None
Martin County, FL/1999	Knack IGR (0.86 EC)	1) 21 (\pm 1) days before harvest 2) 7 (\pm 1) days before harvest	1) 0.0688 2) 0.0675	14	2	tractor-mounted boom sprayers	0.136	None
Fresno County, CA/1999	Knack IGR (0.86 EC)	1) 21 (\pm 1) days before harvest 2) 7 (\pm 1) days before harvest	1) 0.0661 2) 0.0661	14	2	tractor-mounted boom sprayers	0.132	None
Barnwell County, SC/2000	Knack IGR (0.86 EC)	1) 21 (\pm 1) days before harvest 2) 7 (\pm 1) days before harvest	1) 0.0668 2) 0.0677	14	2	tractor-mounted boom sprayers	0.135	None
Martin County, NC/2000	Knack IGR (0.86 EC)	1) 21 (\pm 1) days before harvest 2) 7 (\pm 1) days before harvest	1) 0.0672 2) 0.0642	14	2	tractor-mounted boom sprayers	0.131	None
Pepin County, WI/2000	Knack IGR (0.86 EC)	1) 21 (\pm 1) days before harvest 2) 7 (\pm 1) days before harvest	1) 0.0675 2) 0.0690 1) 0.134 2) 0.136	13	2	tractor-mounted boom sprayers	0.134 (1x) 0.270 (2x)	None

¹ EP = End-use Product

² Trials utilized 9.6-10.5 gallons diluted spray per acre.



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TABLE B.1.3. Trial Numbers and Geographical Locations															
Crop		US Growing Regions												Total trials	
		1	2	3	4	5	6	7	8	9	10	11	12		13
Summer squash	Submitted	1	2	1		1					1				6
	Requested	1	1	1		1					1				5

B.2. Analytical Methodology

The samples were analyzed using the reference method: "Determination of Pyriproxyfen Residues in Apples, Pears, and Citrus Fruits", Valent method RM-33P-1-3a. In brief, residues of pyriproxyfen were extracted from samples with acetone, partitioned with dichloromethane/water, and cleaned using silica gel column chromatography. Quantitation for pyriproxyfen was by gas chromatography with a nitrogen-phosphorus detector (GC/NPD). The limit of quantitation (LOD) was established at 0.01 ppm; the limit of detection (LOD) was not estimated.

C. RESULTS AND DISCUSSION

The number of trials and the geographic representation are both adequate for summer squash as a representative commodity of crop group 9, where five field trials are requested (OPPTS 860.1500, Table 2). No detectable pyriproxyfen residues were found in any of the treated or untreated summer squash samples. The residue decline data showed no detectable pyriproxyfen residues over a PHI range of 3 to 14 days. Doubling the application rate did not change the apparent pyriproxyfen residue level since no residues were detected at 1x or 2x.

Concurrent recovery results indicate that the data collection method is adequate for detecting pyriproxyfen residues in/on summer squash samples (see Table C.1). Satisfactory recovery values were obtained from summer squash samples spiked at 0.02 and 0.10 ppm. All untreated control samples were free of pyriproxyfen residues and interferences.

The longest harvest-to-analysis interval of any field treated sample was 4 days (Table C.2). Thus, a complete storage stability study was not conducted. However, the results of a limited storage stability study demonstrated that pyriproxyfen residues are relatively stable in summer squash when stored frozen for up to 21 days, as indicated by two samples showing an average recovery of 69.4% after 21 days in frozen storage.

As shown in Tables C.3 and C.4, pyriproxyfen residue levels in summer squash samples were all <0.01 ppm, when the PHI and RTI were 7 and 13-14 days, respectively. Table C.4 also shows no change in pyriproxyfen residue levels in/on summer squash samples when the PHI is incremented over a range of 3-14 days, or when the application rate is doubled.



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TABLE C.1. Summary of Concurrent Recoveries of Pyriproxyfen from Summer squash.

Matrix	Analyte	Spike level (mg/kg)	Sample size (n)	Recoveries (%)	Mean \pm std dev
Summer squash	Pyriproxyfen	0.020	8	92-106	98 \pm 4
		0.10	8	92-105	98 \pm 4

TABLE C.2. Summary of Storage Conditions

Matrix (RAC or Extract)	Storage Temp. ($^{\circ}$ C)	Longest harvest-to-analysis interval of field samples (days)	Limit of Demonstrated Storage Stability (days)
Summer squash	<0	4	21

TABLE C.3. Residue Data from Crop Field Trials with Pyriproxyfen.

Location (City, State/Year)	Region	Crop/Variety	Application Rate, lbs ai/A	Total Rate, lbs ai/A	RTI (days)	PHI (days)	Residues (ppm)
Lehigh County, PA/1999	1	Summer squash/ MultiPik	0.0688 0.0677	0.136	14	7	<0.01, <0.01
Martin County, FL/1999	3	Summer squash/ Hurricane	0.0688 0.0675	0.136	14	3	<0.01, <0.01
						7	<0.01, <0.01
						10	<0.01, <0.01
						14	<0.01, <0.01
Fresno County, CA/1999	10	Summer squash/ Superset F1	0.0661 0.0661	0.132	14	7	<0.01, <0.01
Barnwell County, SC/2000	2	Summer squash/ Gentry	0.0668 0.0677	0.135	14	7	<0.01, <0.01
Martin County, NC/2000	2	Summer squash/ Seneca Hybrid	0.0672 0.0642	0.131	14	7	<0.01, <0.01
Pepin County, WI/2000	5	Summer squash/ Monet	0.0675 0.0690	0.134 (1x)	13	7	<0.01, <0.01
			0.134 0.136	0.270 (2x)	13	7	<0.01, <0.01



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TABLE C.4. Summary of Residue Data from Crop Field Trials with Pyriproxyfen.								
Commodity	Total Applic. Rate, lb a.i./A	PHI (days)	Analyte	Residue Levels (ppm)				
				Min.	Max.	HAFT*	Mean	Std. Dev.
Summer squash	0.132	7	Pyriproxyfen	<0.01	<0.01	<0.01	<0.01	NA

* HAFT = Highest Average Field Trial.

D. CONCLUSION

The crop field trials for summer squash are classified as acceptable and satisfy the guideline requirements for crop field trials (Residue Chemistry Guidelines OPPTS 860.1500) as they apply to "Vegetable, cucurbit, group 9."

E. STUDY DEFICIENCIES/CLARIFICATIONS

None.